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2021 WORLD FUEL CELL CONFERENCE

AUGUST 17-20, 2021 | WATERLOO, CANADA

Name	Dmitri Bessarabov
Affiliation	HySA Center at NWU, South Africa: Director

Invited Keynote Lecture

Presentation Title	**PEM technology for water electrolysis and electrochemical hydrogen compression**
Abstract (Approximately 200 words)	PEMs (proton-exchange membranes) are one of the key components in zero-gap acidic water electrolysis (WE) and electrochemical hydrogen compression (EHC). These membranes act as electrical (electronic) insulators and gas barriers allowing oxygen and hydrogen separation and high-pressure discharge of hydrogen at the cathode. They also act as charge carriers (H^+) and responsible for a large share of the IR-drop in the electrochemical cells. An overview of PEM technology suitable for both WE and EHC will be discussed. Challenges such as hydrogen cross over and hydrogen cathode oversaturation that are similar to both PEMWE and EHC will be discussed as well as their measuring techniques. Opportunities for low temperature and high temperature processes as well as gas separation efficiency achieved in the EHC process will also be discussed.
Biographical Sketch (Approximately 200 words)	Prof. Dmitri Bessarabov joined DST HySA Infrastructure Center of Competence in 2010. He was recruited for a position from Canada. He received his PhD in 1996 specializing in membrane technology for gas separation from University of Stellenbosch in South Africa. In 2001 Dmitri joined Aker Kvaerner Chemetics in Vancouver, Canada, to work in the area of membrane technology for chlor-alkali industry. In 2006 Dmitri joined Ballard Power Systems in Canada (and afterwards AFCC – Automotive Fuel Cell Cooperation Corp) where he was leading an R&D group on MEA Integration and Evaluation, working for HyWay5 automotive program with focus on CCMs. His main areas of professional interest include: Fuel cells, PEM Electrolysis, Hydrogen Storage, Hydrogen Infrastructure, Membranes, Separations, Applied Electrochemistry. Successfully built and managed large (up to 25 plus head-count) teams of academics and engineers with deep technical capabilities. Current focus is on the National South African Hydrogen Road Map development as well as on PEM water electrolysis, EHC (electrochemical hydrogen compression) and H2 storage in LOHC.